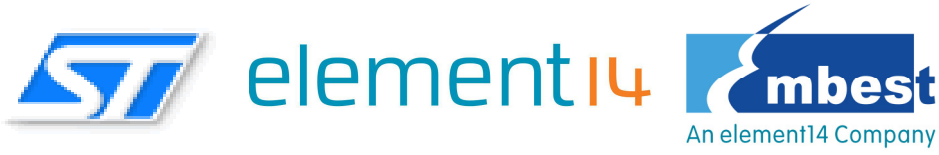
STM32F4DIS-BB Quick Start Manual

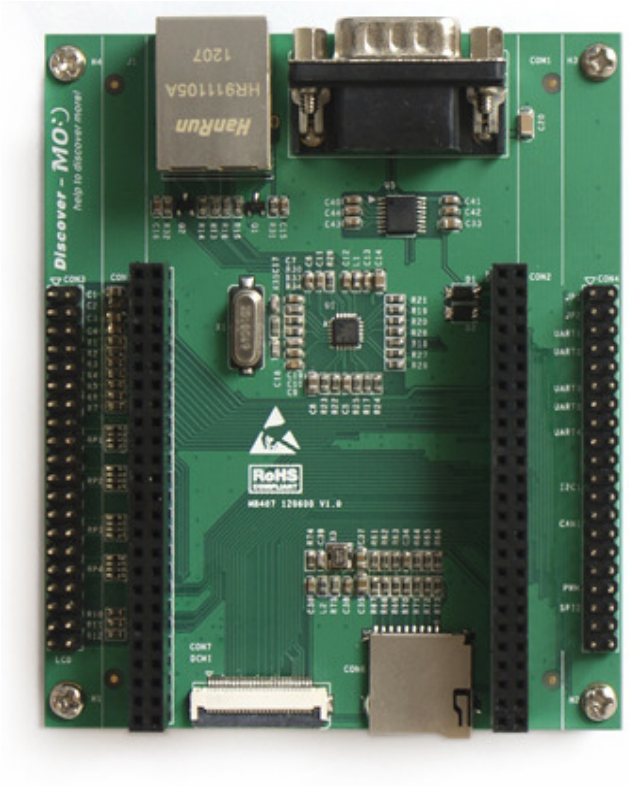
Discover-more

help to discover more!



STM32F4DIS-BB Base Board

- Base Board for STM32F4DISCOVERY High-Performance Discovery Board
- Extended peripherals including UART, Ethernet, CAN, Camera, LCD, TF, SPI, I2C
- Supports optional 3.5” LCD module and 1.3 Megapixel digital camera module
- Supports Micrium µC/OS-II_v2.86 & µC/GUI_v3.90a
- Supports FatFs_vR0.08a File System (Used for TF card)
- Supports LwIP_v1.3.2 Protocol Stack



Declaration

element14/Embest and ST have launched the STM32F4DIS-BB, a low cost development platform based on STM32F4DISCOVERY.The platform also supports two modules STM32F4DIS-LCD, STM32F4DIS-CAM.

Glossary

Term	Meaning
STM32F4DIS-BB, DM-STF4BB	the Base Board for the STM32F4DISCOVERY
STM32F4DIS-LCD,DM-LCD35RT	the LCD module for the STM32F4DIS-BB
STM32F4DIS-CAM,DM-CAM130	the Camera module for the STM32F4DIS-BB
Devkit407	STM32F4DIS-BB and STM32F4DISCOVERY

STM32F4DIS-BB,STM32F4DIS-LCD,STM32F4DIS-CAM are the ST part numbers.

DM-STF4BB,DM-LCD35RT,DM-CAM130 are the Embest part numbers.

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Version of update records:

Rev	Date	Description
V1.0	2012-10-23	Initial version

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Charter 1 Overview

1.1 STM32F4DIS-BB build the product

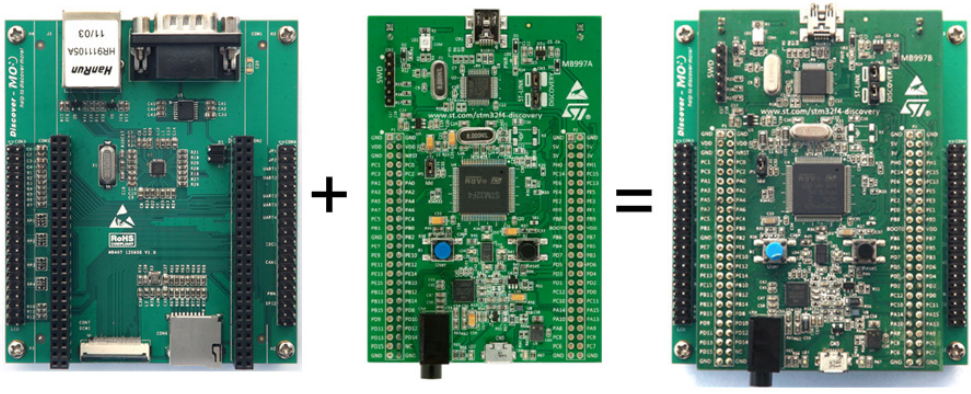
- **Product introduce**

  The STM32F4DIS-BB Base Board from Embest is an expansion board designed especially for STMicroelectronics' STM32F4DISCOVERY high-performance evaluation board which is based on the STM32F407VGT6 ARM Cortex-M4 microcontroller and includes an ST-LINK/V2 embedded debug tool an USB OTG micro-AB connector on board.

  The STM32F4DIS-BB Base Board enables the STM32F4DISCOVERY board users to become more familiar with features of the STM32F4. It has incorporated additional functionality to the STF32F4DISCOVERY board, including Serial ports, USB, Ethernet, CAN, SPI, I2C, GPIO, Camera, TF Card, LCD and Touch Screen interfaces on board. The combination of the **STM32F4DIS-BB** and the **STM32F4DISCOVERY** forms platform for evaluating the STM32F4xx series ARM Cortex-M4 microcontrollers and allows easy prototyping of third party solutions with STM32F4DISCOVERY board or STM32F4xx series microcontrollers.

- **Product composition**

  DevKit407 = STM32F4DISCOVERY + STM32F4DIS-BB



STM32F4DIS-BB STM32F4DISCOVERY DevKit407

Figure 1-1 Product composition

1.2 Getting Started Quickly

This section will help the user to understand how to use the DevKit407 evaluation board and how to use the CD-ROM data quickly. For more information please refer to the documents below at respective locations.

For Hardware Development:

Hardware system	Introduce CPU,expanded chip and hardware interface	CD->\User Manual\1.6 Hardware Features 2.1 CPU 2.2 Hardware interface
Datasheet	learn principle and configuration of DevKit407 chips	CD->\HW design\datasheet
Schematic diagram of STM32F4DISCOVERY	Understand the hardware layout STM32F4DISCOVERY	CD-> \HW_design\schematic\ STM32F4DISCOVERY board User Manual.pdf->6 Electrical schematics
Schematic diagram of STM32F4DIS-BB	Understand the hardware layout STM32F4DIS-BB	CD-> \HW_design\schematic
Mechanical drawing of DevKit407	Refer to the actual length and height of DevKit407 for mechanical mounting	CD-> \User Manual\2.3 Pin multiplexing

For Software Development:

Build software development environment	Keil MDK and IAR EWARM development environment build, and directions for use	CD -> \Application_Notes\ STM32F4-Discovery\Usermanual*Getting started with software and firmware environments for the STM32F4DISCOVERY Kit.pdf*
Software development	STM32F4DIS-BB peripherals Examples	CD ->\code\ STM32F4xx_Discovery_StdPeriph_Demo
	STM32F4DIS-BB system-level application demos.uc/OS-II and uC/GUI	CD ->\code
	STM32F4DISCOVERY peripherals Examples	CD ->\Application_Notes\ STM32F4-Discovery\FIRMWARE

For Marketing:

Hardware system	Introduce the hardware characteristics and the related resources	CD->\User Manual\1.6 Hardware Features 2.1 CPU 2.2 Hardware interface
Software system	Introduce the software characteristics and the related resources	CD->\User Manual\1.7 Software Features
Mechanical drawing of DevKit407	See table above and see the same text.	CD-> \User Manual\2.3 Pin multiplexing

For Personal Learning:

It is suggested that all the sections in each chapter of this Manual are browsed and studied.

1.3 CD Data Introduction

CD Data Structure as follow:

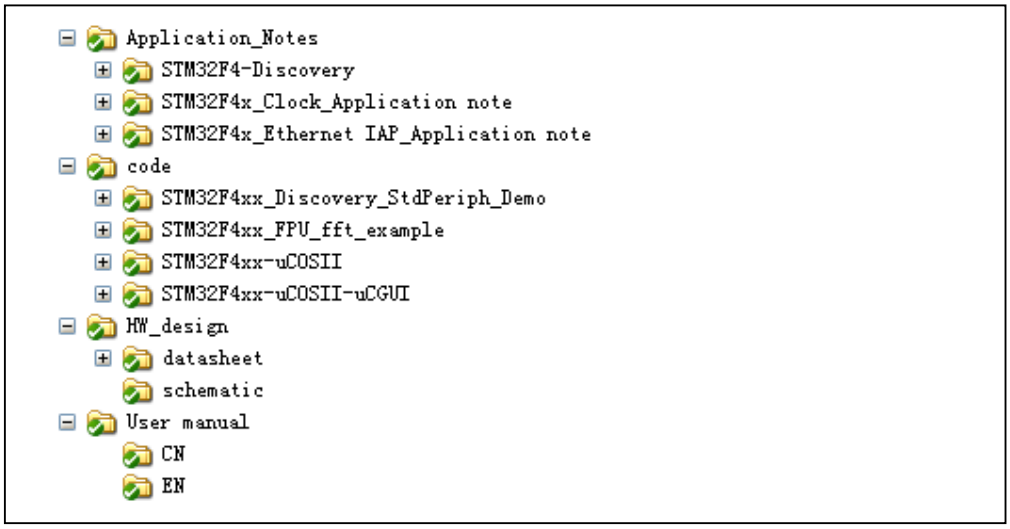


Figure 1-2 CD Data structure

CD content is introduced:

1） Application_Note

This folder contains the following contents:

- STM32F4-Discovery

  Include all STM32F4DISCOVERY evaluation board of relevant resources

- Others are DevKit407 function application Notes

2）code

This folder contains the following contents:

- STM32F4xx_Discovery_StdPeriph_Demo

  Include all STM32F4DIS-BB peripherals Examples

- STM32F4xx_FPU_fft_example

  FFT example runs on DevKit407

- STM32F4xx-uCOSII

  DevKit407 uC/OS-II-v2.86 BSP Drive

- STM32F4xx-uCOSII-uCGUI

  DevKit407 uC/OS-II-v2.86 & uC/GUI-v3.90a BSP Drive

3）HW_design

This folder contains the following contents:

- Datasheet

  DevKit407 all chips datasheet

- Schematic

  STM32F4DIS-BB & STM32F4DISCOVERY schematic diagram

4）User manual

DevKit407 user manual in both English and Chinese.

Charter 2 Setup for Development Environment

2.1 Hardware Setup

Please mount STM32F4DISCOVERY board onto STM32F4DIS-BB board through CON1 and CON2, and let's start!

Running the built-in demonstration

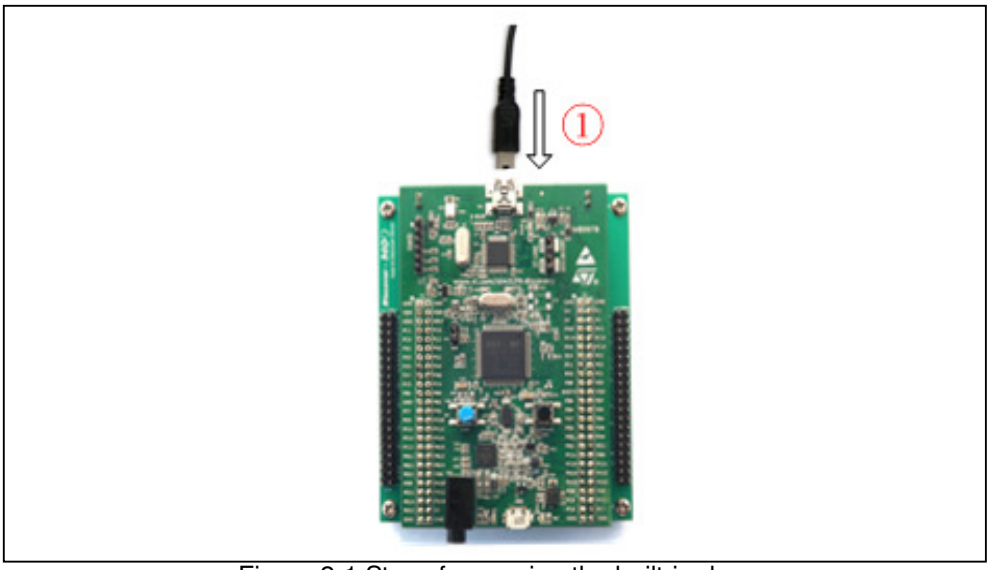


Figure 2-1 Steps for running the built-in demo

1) Connect the STM32F4DISCOVERY board to a PC with a 'USB type A to Mini-B' cable through USB connector CN1 to power the board.
2) The Demo will be start.

2.2 Software Setup

2.2.1 Development toolchain

The DevKit407 support two development environments, Keil MDK-ARM and IAR EWARM,MDK-ARM require V4.22a or above version, EWARM require V6.40 or above version.The instructions given in ***Getting started with software and firmware***

environments for the STM32F4DISCOVERY Kit.pdf describe how to use development toolchains, to build, debug and run your project. Please refer to the document for more detail.

2.2.2 HyperTerminal connection

In order to use a HyperTerminal on PC, please follow the below process to setup Hyper Terminal connection (for example, on Windows XP OS):

1) Select *Start -> All Programs -> Accessories -> Communication -> Hyper Terminal*. Find the HyperTerminal, as shown below:

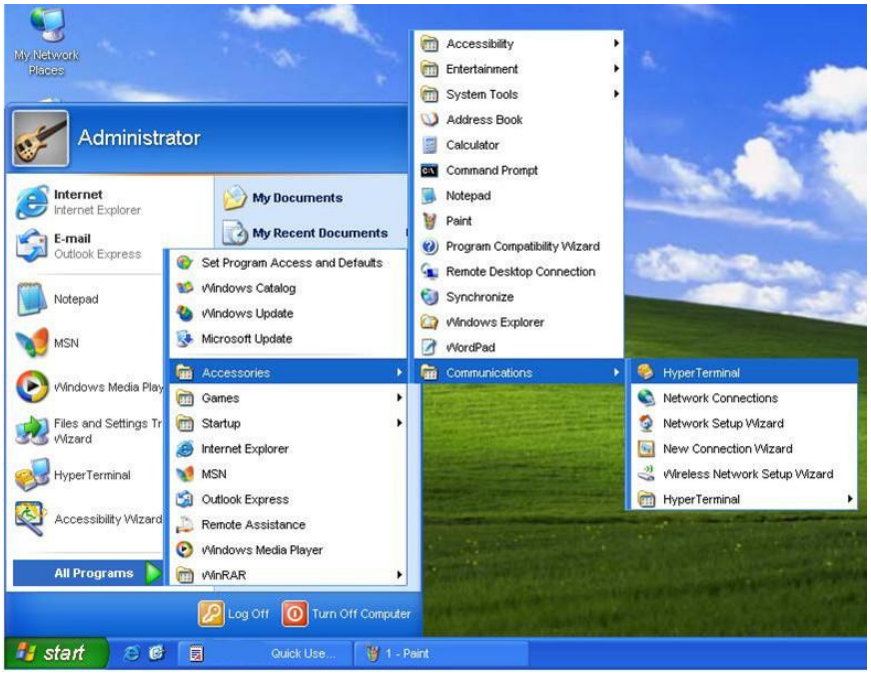


Figure 2-2 Create a new HyperTerminal

2) Create a new HyperTerminal connection, enter a name and choose an icon.

Figure 2-3 Description for new connection

3) Select the specific serial port from the list as per your computer COM port configuration:

Figure 2-4 Select a COM port for connection

4) Set parameters for serial port connection as follows:

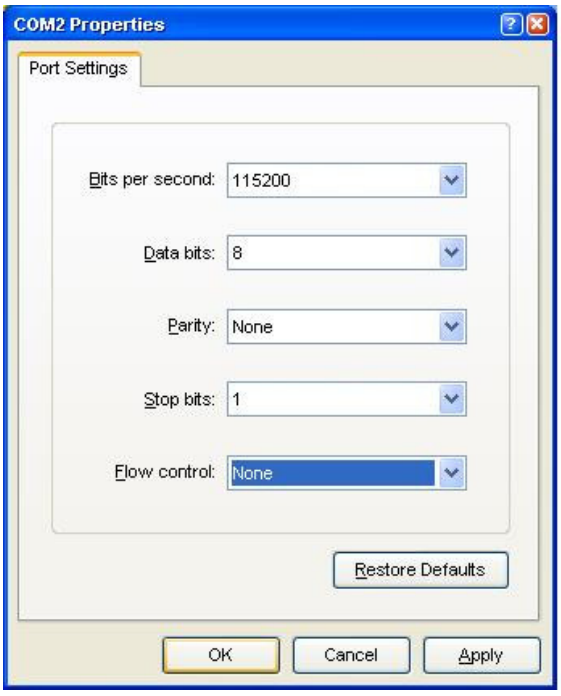


Figure 2-5 Settings for the selected port

5) A Hyper Terminal connection with PC serial port have been established as shown below:

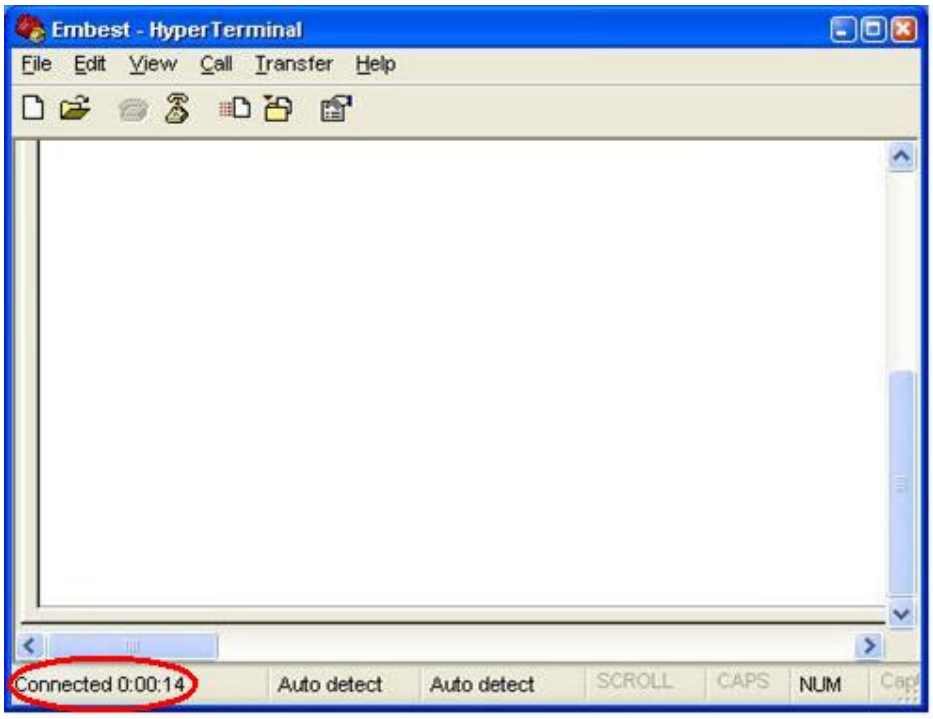


Figure 2-6 Hyper Terminal successfully built

2.2.3 PC network settings

In order to test Ethernet examples, please set up the PC network environment. Make sure that the PC's IP address and the DEVKIT407 board's IP address are on the same network.

1) On PC, select *Start-> Control Panel-> Network connections-> Local Area Connection-> Properties*, as shown below:

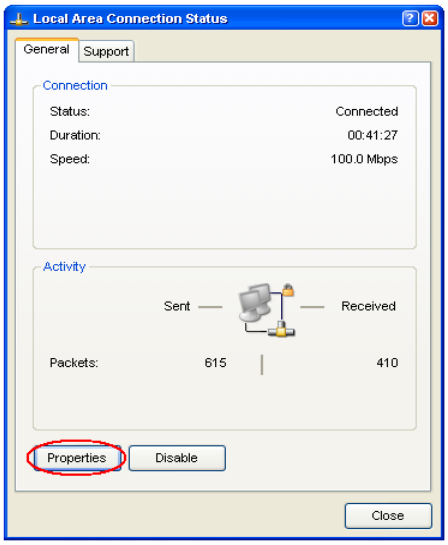


Figure 2-7 Local Area Connection

2) Click 'Properties', this will open the window of Local Area Connection Properties, as shown below:

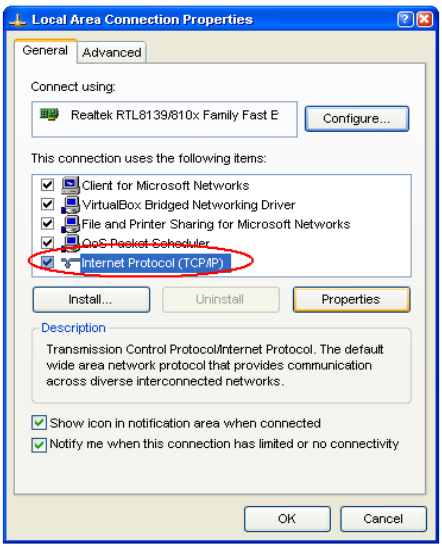


Figure 2-8 Local Area Connection Properties

3) Double click ‘TCP / IP Options’, opens a window for TCP / IP Properties, as shown below:

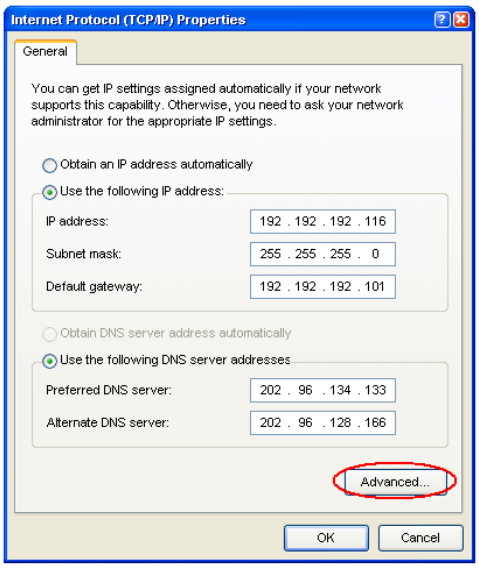

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 192 . 192 . 116
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 192 . 192 . 101
Obtain DNS server address automatically
Use the following DNS server addresses
Preferred DNS server: 202 . 96 . 134 . 133
Alternate DNS server: 202 . 96 . 128 . 166
Advanced...
OK
Cancel

Figure 2-9 TCP / IP Options

4) Click the ‘Advanced’ option, open a window for “Advanced TCP / IP settings”, as shown below:

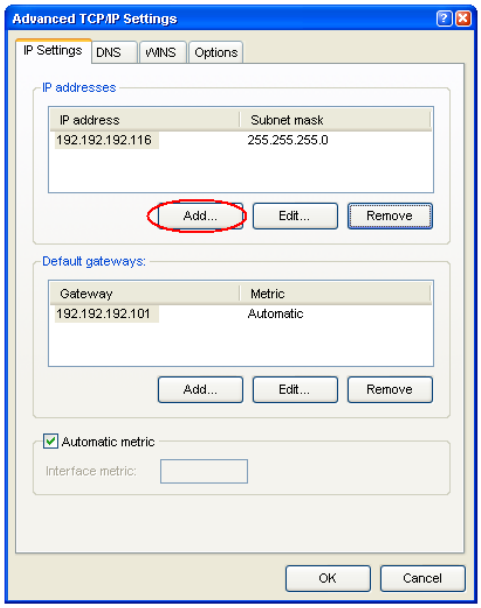


Figure 2-10 Advanced TCP / IP settings

5) Click the ‘Add’ option, open a window for "Add TCP / IP".

Enter the IP address and subnet mask, and then click "Add”, as shown below:

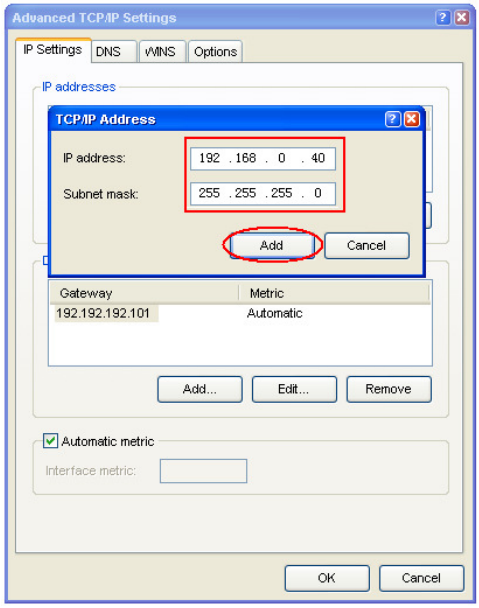


Figure 2-11 Add TCP/IP address

6) Click “OK” to finish network setup.

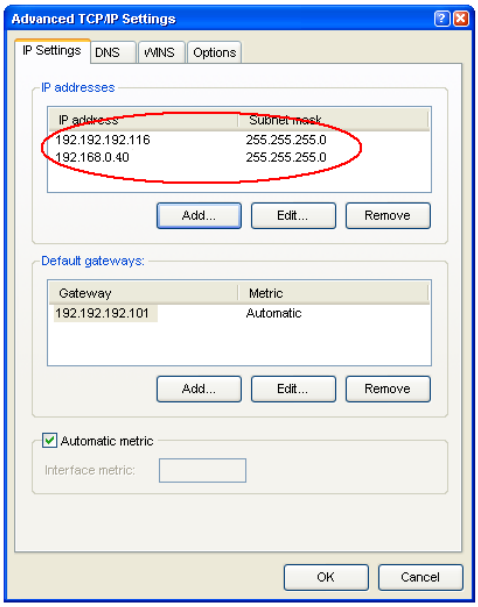


Figure 2-12 TCP/IP address successfully setup

Charter 3 Peripherals examples

3.1 USART_Printf example

This example shows how to retarget the C library printf function to the USART. The implementation output the printf message on the hyperterminal using USART6.

Note: *Please configure HyperTerminal (refer to Section 2.2.2 HyperTerminal connection) before testing this example.*

The example is located in the following folder:

\code\STM32F4xx_Discovery_StdPeriph_Demo\Project\STM32F4xx_StdPeriph_Examples\01-USART\USART_Printf

In order to run the example, please follow the steps below:

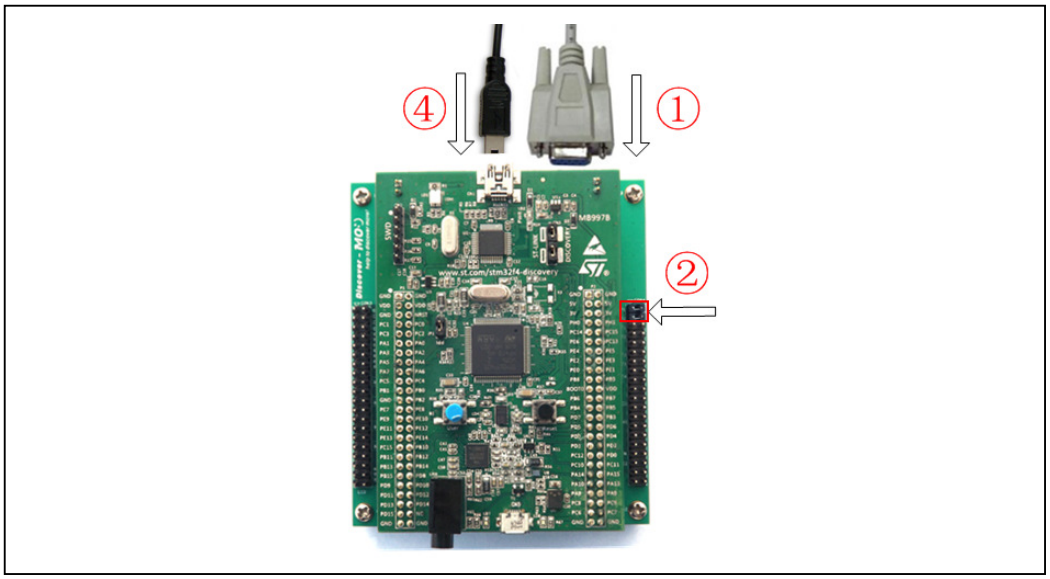


Figure 3-1 Steps for running USART_Printf example

1) Connect a null-modem female/female RS232 cable between the DB9 connector COM1 (USART6) and PC serial port.
2) Make sure that jumpers JP1 and JP2 are both fitted.
3) Open hyperterminal on PC.
4) Connect the STM32F4DISCOVERY board to a PC with a 'USB type A to Mini-B' cable

through USB connector CN1 to power the board.

5) Open the project, rebuild all files, load project image and then run the program.

When the program is running, the hyperterminal displays the message as below:

```
USART Printf Example: retarget the C library printf function to the USART
```

Type a character on the keyboard, then the hyperterminal displays the received character on the screen.

3.2 SDIO Fatfs File System example

This example provides an example of how to use the SDIO firmware library and an associated driver to implement the Fatfs file system on the SD Card memory.

Note: *Please configure HyperTerminal (refer to Section 2.2.2 HyperTerminal connection) before testing this example.*

The example is located in the following folder:

```
\code\STM32F4xx_Discovery_StdPeriph_Demo\Project\STM32F4xx_StdPeriph_Examples\02-SDIO\FatFs
```

In order to run the example, please follow the steps below:

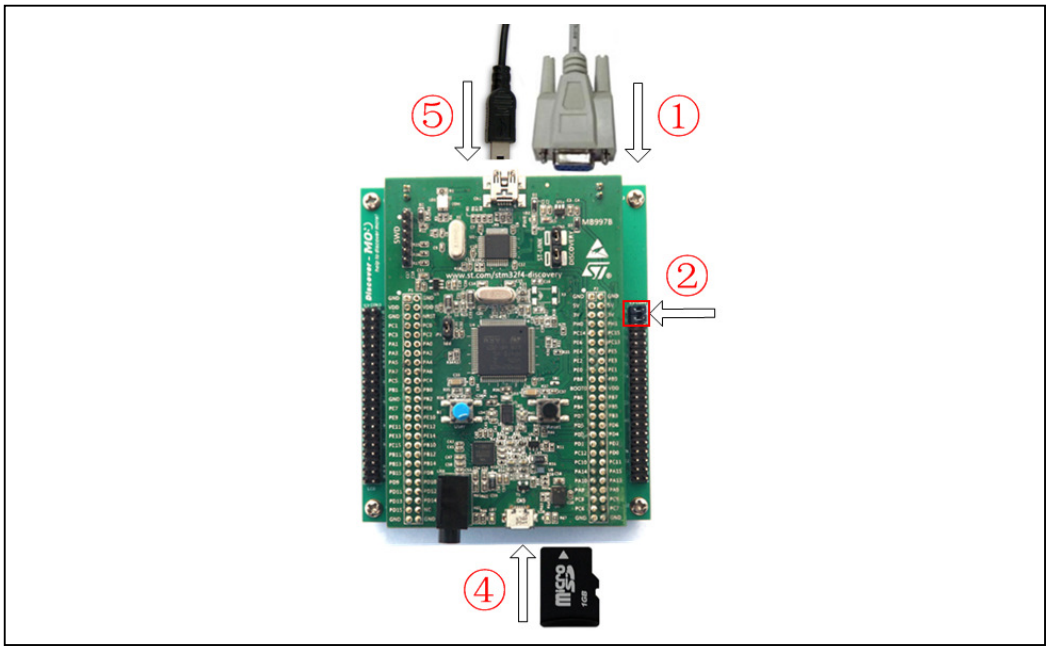


Figure 3-2 Steps for running SDIO example

1) Connect a null-modem female/female RS232 cable between the DB9 connector COM1 (USART6) and PC serial port.
2) Make sure that jumpers JP1 and JP2 are both fitted.
3) Open hyperterminal on PC.
4) Insert a TF card into microSD slot CON6.
5) Connect the STM32F4DISCOVERY board to a PC with a 'USB type A to Mini-B' cable through USB connector CN1 to power the board.
6) Open the project, rebuild all files, load project image and then run the program.

Note: *Kingston and SanDisk's TF card (capacity less than 2GB) is recommended. In order to test successfully, the card should be formatted in FAT32 before use.*

3.3 LCD examples

There are two example in the folder of LCD, LCD example for LCD test and LCD_Touch example for LCD touch screen calibration.

The examples are located in the following folder:

\code\STM32F4xx_Discovery_StdPeriph_Demo\Project\STM32F4xx_StdPeriph_Examples\03-LCD

In order to run LCD_35T and LCD_Touch examples, please follow the steps below:

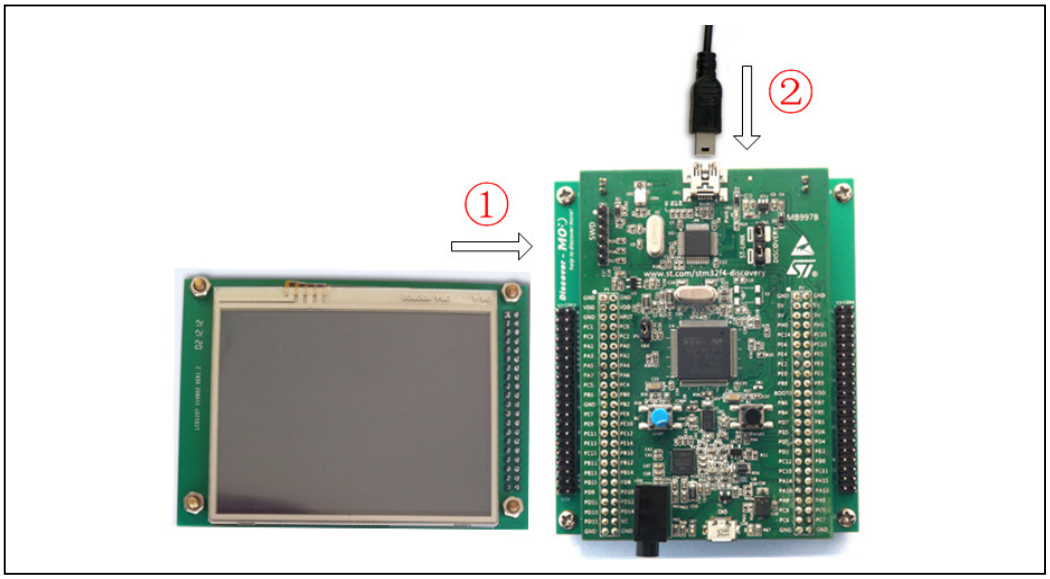


Figure 3-3 Steps for running LCD examples

1) Connect LCD module STM32F4DIS-LCD to DevKit407 CON3 via LCD cable.
2) Connect the STM32F4DISCOVERY board to a PC with a 'USB type A to Mini-B' cable through USB connector CN1 to power the board.
3) Open the LCD_35T project, rebuild all files, load project image and then run the program. When the program is running, the red, green and blue ribbons appear on the LCD.
4) Open the LCD_Touch project, rebuild all files, load project image and then run the program. Click on calibration points accurately with a touch pen. LCD will give massage whether calibration is OK.

3.4 DCMI example

This example shows how to use the DCMI to control the OV9655 Camera module.

The examples are located in the following folder:

\code\STM32F4xx_Discovery_StdPeriph_Demo\Project\STM32F4xx_StdPeriph_Examples\04-DCMI

In order to run the example, please follow the steps below:

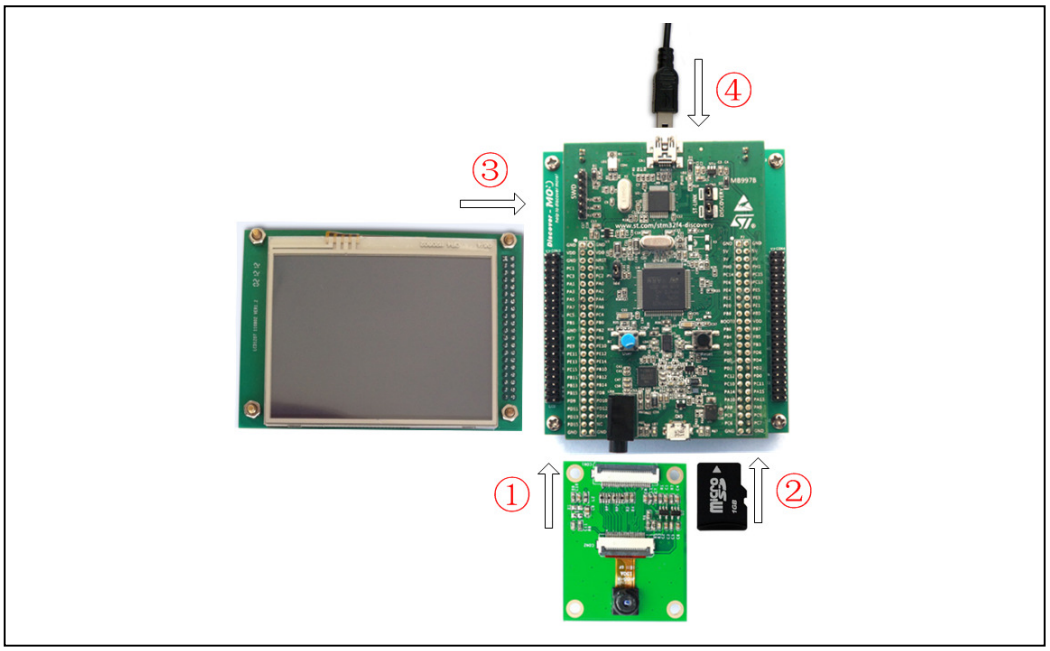


Figure 3-4 Steps for running DCMI example

1) Connect the Camera module (STM32F4DIS-CAM) CON1 to DevKit407 CON7 via FFC soft cable when the power is turned off.

   Note: Please make sure that STM32F4DIS-CAM is mounted correctly and *JP1 and JP2 are not fitted.*

2) Insert a TF card into microSD slot CON6.

3) Mount LCD module onto DevKit407 board through CON3

4) Connect the STM32F4DISCOVERY board to a PC with a 'USB type A to Mini-B' cable through USB connector CN1 to power the board.

5) Open the project, rebuild all files, load project image and then run the program.

6) When the program is running, images collected by the module are shown on the LCD. Press User button to take a photograph. The photograph will be stored in the TF card automatically, and named “PICxx.BMP”. ”xx” is picture’s number; “BMP” is picture’s format.

   Note: *Kingston and SanDisk’s TF card (capacity less than 2GB) is recommended. In order to test successfully, the card should be formatted in FAT32 before use.*

3.5 ETH_LwIP FreeRTOS httpserver_netconn example

This example implements a web server application, based on the netconn API, for STM32F4x7 devices.

Note: *Please setup PC network (Section 2.2.3 PC network settings) before testing this example.*

The examples are located in the following folder:

\code\STM32F4xx_Discovery_StdPeriph_Demo\Project\STM32F4xx_StdPeriph_Examples\05-ETH_LwIP\FreeRTOS\httpserver_netconn

In order to run the example, please follow the steps below:

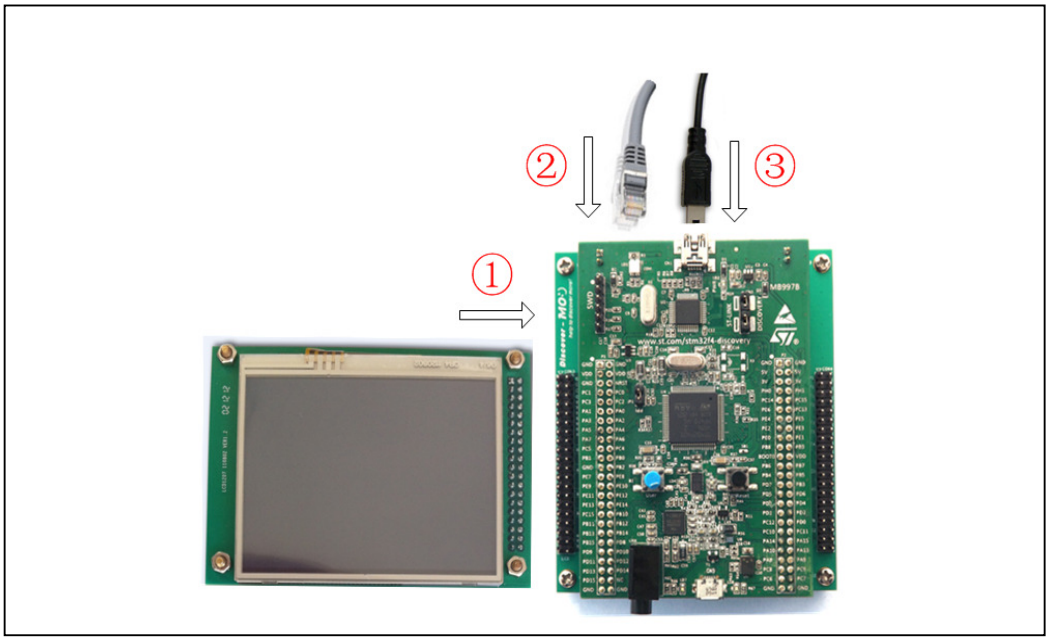


Figure 3-5 Steps for running FreeRTOS http_netconn example

1) Connect LCD module STM32F4DIS-LCD to DevKit407 CON3 via LCD cable.
2) Connect the DevKit407 board to a PC with a crossover Ethernet cable through RJ45 connector J1.
3) Connect the STM32F4DISCOVERY board to a PC with a 'USB type A to Mini-B' cable through USB connector CN1 to power the board.
4) Open the project, rebuild all files, load project image and then run the program.
5) When the program is running, the LCD displays the IP address of the DevKit407

board. On a remote PC on the same network, open a web client (Mozilla Firefox or Internet Explorer) and type the board's IP address in a web browser. The default IP address is 192.168.0.10.

Charter 4 uC/OS-II and uC/GUI demo

This example provides a description of how to use the uC/OS-II RTOS and uC/GUI on the STM32F4xx platform.

The MDK project of uC/OS-II and uC/GUI demo is located in the following folder:

code\STM32F4xx-uCOSII-uCGUI\Project\MDK-ARM

In order to run the example, please follow the steps below:

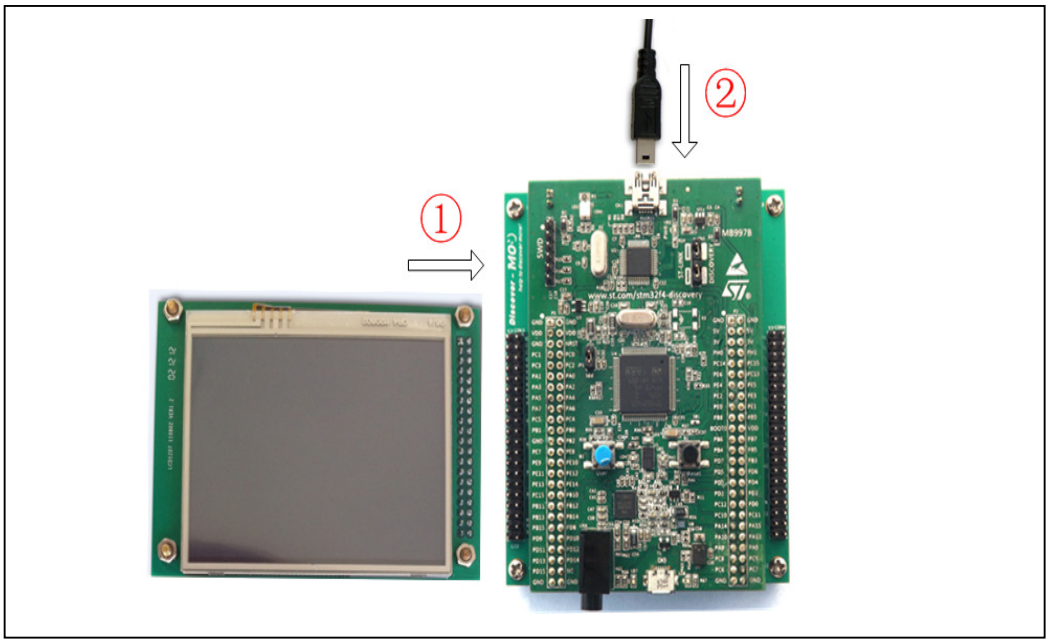


Figure 4-1 Steps for running uC/OS-II & uC/GUI

1) Connect LCD module STM32F4DIS-LCD to DevKit407 CON3 via LCD cable.
2) Connect the STM32F4DISCOVERY board to a PC with a 'USB type A to Mini-B' cable through USB connector CN1 to power the board.
3) Open the MDK project, rebuild all files, load project image and then run the program.
4) When the program is running, the LCD displays the uC/OS-II and uC/GUI demo.

Technical support & Warranty Service

Embest Technology Co.,LTD., established in March of 2000, is a global provider of embedded hardware and software. Embest aims to help customers to reduce time to market with improved quality by providing the most effective total solutions for the embedded industry. In the rapidly growing market of high end embedded systems, Embest provides comprehensive services to specify develop and produce products and help customers to implement innovative technology and product features. Progressing from prototyping to the final product within a short time frame and thus shorten the time to market, and to achieve the lowest production costs possible. Embest insists on a simple business model to offer customers high-performance, low-cost products with best quality and service. The content below is the matters need attention for our products technical support and warranty service:

Technical support service

Embest provides one year free technical support service for all products. Technical support service covers:

- Embest embedded platform products software/hardware materials
- Assist customers compile and run the source code we offer.
- Solve the problems occurs on embedded software/hardware platform if users follow the instructions in the documentation we offer.
- Judge whether the product failure exists.

Special explanation, the situations listed below are not included in the range of our free technical support service, and Embest will handle the situation with discretion:

- Software/Hardware issues user meet during the self-develop process

- Issues happen when users compile/run the embedded OS which is tailored by users themselves.
- User's own applications.
- Problems happen during the modification of our software source code

Maintenance service clause

1) The products except LCD, which are not used properly, will take the warranty since the day of the sale:

   PCB: Provide 12 months free maintenance service.

2) The situations listed below are not included in the range of our free maintenance service, Embest will charge the service fees with discretion:
   a) Can't provide valid Proof-of-Purchase, the identification label is torn up or illegible, the identification label is altered or doesn't accord with the actual products;
   b) Don't follow the instruction of the manual in order to damage the product;
   c) Due to the natural disasters (unexpected matters), or natural attrition of the components, or unexpected matters leads to the defects of appearance/function;
   d) Due to the power supply, bump, leaking of the roof, pets, moist, impurities into the boards, all those reasons which lead the defects of appearance/function;
   e) User unauthorized weld or dismantle parts leads the product's bad condition, or let other people or institution which are not authorized by Embest to dismantle, repair, change the product leads the product bad connection or defects of appearance/function;
   f) User unauthorized install the software, system or incorrect configuration or computer virus leads the defects;
   g) Purchase the products through unauthorized channel;

h) Those commitments which is committed by other institutions should be responsible by the institutions, Embest has nothing to do with that;

3) During the warranty period, the delivery fee which delivery to Embest should be covered by user, Embest will pay for the return delivery fee to users when the product is repaired. If the warranty period is expired, all the delivery fees will be charged by users.

4) When the board needs repair, please contact technical support department.

Note: *Those products are returned without the permission of our technician, we will not take any responsibility for them.*

Basic notice to protect and maintain the LCD panel

1) Do not use finger nails or hard sharp objects to touch the surface of the LCD.

2) Embest recommends the use of special screen wipers to wipe the LCD after long time use, please avoid clean the surface with fingers or hands to leave fingerprint.

3) Do not clean the surface of the screen with chemicals, otherwise user can not enjoy above service.

Note: *Embest do not supply maintenance service to LCD. We suggest the customer first check the LCD after getting the goods. In case the LCD can not run or show no display, customer should inform Embest within 7 business days from the moment of getting the goods.*

Value Added Services

We will provide following value added services:

- Provided services of driver develop based on Embest embedded platform, like serial port, USB interface devices, LCD screen.
- Provided the services of control system transplant, BSP drivers development, API software development.
- Other value added services like power adapter, LCD parts.
- Other OEM/ODM services.
- Technically training.

Please contact Embest to get technical support:

- Support Tel:+86-755-25503401
- Fax:+86-755-25616057
- Pre-Sale consultation: market@embedinfo.com
- After-Sale consultation: support@embedinfo.com